No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
Appendix B2 - Ecological PRG Derivation						
B2-1	DEQ	Appendix B2 General	Benthic Approach	The benthic approach is not clear. • RAO 5 Selected PRGs: How was the chemical list decided for protection of benthos? What was the hierarchy for selecting the source of benthic toxicity PRGs (LRM first, then PECs?)? It is noted that several of the EPA selected values, such as dieldrin, cadmium, and mercury are above those developed by the LWG in the FS from site specific models for the same chemical. Recommend using the LRM model in its entirety to predict areas of toxicity using all associated sediment criteria to make those predictions. Then use the results of the toxicity tests as the final criteria. • Toxicity Test Interpretation: Text in FS Section 2 describes that both survival and biomass must be considered a "hit" before it is considered exceeding a risk based PRG. It should be clarified how this is applied. If by species, what is the interpretation if only one of the endpoints exceed Level III thresholds? This is clearly a higher magnitude effect. Additionally, what if Level II survival is considered a hit but not biomass? DEQ understands there is concern taking action on Level II biomass hits, but Level II survival hits seem more of a concern. • Identification of Potentially Toxic Areas: What model / values will be used to identify or predict potential toxicity areas (haven't been tested yet) for evaluation in the FS? A comprehensive model (mean quotients, FPM, or LRM) is recommended. It would be best if this model matched the toxicity test interpretation (see above recommendation). For example, if the LRM was used, it would describe the probability that sediment would be toxic at a given threshold level. That threshold level would also be used to interpret the bioassay tests.	EPA input needed • not sure how the order of preference was derived, can confirm that toxicity test results were considered the strongest line of evidence for evaluation of risks to benthic macroinvertebrates • need to confirm that a "hit" (or PRG exceedance) is identified as an effect on either species and either endpoint (does not require both) • re: potentially toxic areas that have not been subjected to toxicity testing – Need to confirm that FPM will not be used, and roles of mean quotients and LRM.	CDM
B2-2	DEQ	Appendix B2 RAO 6 - wildlife	RAO 6 - Wildlife PRGs	Specific input parameters are needed (e.g., assumptions on organic carbon, lipid content used for back calculation, and specifics on the acceptable tissue level derivation). More detail on wildlife PRG development needs to be provided such as equations and tables that summarize the methodology and input parameters, similar to the HH evaluation.	Recommendation is acceptable, input parameters will be summarized on Table.	CDM
B2-3	Five Tribes	Appendix B2 Introduction	Editorial	Since there are two Appendix A's, there is potential for confusion in reference to tables and equations. Proposed changes such as the following to the last sentence of the introduction paragraph: "Ecological PRGs for sediment, surface water and TZW are presented in Tables A2-1, A2-2 and A2-3 , respectively."	Recommendation is acceptable. Recommended text changes will be made.	CDM

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
B2-4	DEQ	Appendix B2 Section 1.0 Sediment PRGs	Organic Carbon	PRG Specific Comments: • Organic Carbon varied significantly in the Site. Therefore, DEQ recommends using the OC normalized PRG and the actual OC detected in each sample. • TBT: The worm PRG (tissue residue) was developed in units of mg/kg-OC (LWG Early PRGs 2009). However, the TBT PRG from the LRM for benthic toxicity was developed in dry weight. This should be flagged as it will be misinterpreted. • Where did the TPH sediment values come from? The table cites the LRM, but those numbers are OC-fines normalized.	• Sample-specific OC is most applicable to receptors with limited mobility, such as BMI. Text revisions will include recommended application of OC-normalized and sample-specific PRGs. • Revised text will clarify that residue PRG for TBT is expressed as OC, and the toxicity-based PRG is expressed in dry weight.	CDM
B2-5	Five Tribes	Appendix B2 Section 1.0 Sediment PRGs, first paragraph, page 1	ARARs	Several points: 1) ARARs are a requirement, so the omission of ARARs ought to be explained in the text here or in the body of the report. 2) Since there are identified ARARs for surface water, those should be mentioned in Section 2 by specific reference to Oregon WQS. 3) EPA does have a fledgling program in sediment quality that has yet to produce numerical criteria. Nonetheless, EPA's recognition of the importance of sediment and plan to develop criteria constitutes an implicit albeit non-specific ARAR and might be worth passing mention here in Section 1. There is more information at: http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/sediment/index.cfm	1) ARAR text removed following internal discussions between EPA staff on 7/16/14). 2) Text will be revised by inserting sentence stating that the only ecological risk-related ARARs are Oregon's water quality standards for aquatic life, and note that those are the same as or very similar to EPA's NRWQC for aquatic life. 3)Text will be revised to reveal that no specific sediment-associated ARARs are currently available, while recognizing that EPA is working towards derivation of sediment ARARs.	CDM
B2-6	Five Tribes	Appendix B2 Section 1.0 Sediment PRGs, first paragraph, page 1	Editorial	The language identified below is ambiguous and I suggest leaving out the phrase "through sediment remedies at the Site." The problem is that it is unclear what this phrase is intended to modify: "to…reduce" or "unacceptable risks." Presumably the former, but on first read I took the latter and thought this meant that only risks that arose from remedial actions were of concern—i.e., future created contamination, not historical contamination. "The goals are to: 1) reduce potentially unacceptable risks to ecological receptors from contaminant concentrations in sediments <u>through sediment remedies at the Site</u>..."	Recommended revision is acceptable and the phrase will be removed or clarified.	CDM
B2-7	DEQ	Appendix B2 Section 1.0 Sediment PRGs, third paragraph, page 2	Methodology	With respect to the statement below, it would be helpful to describe what methodology was used to develop the PRGs since the methods described by the LWG were not used in all cases. "The sediment PRGs presented in Table A1 that are based on either tissue residue or ingested dietary dose ecological risks from the BERA were generated using BSAFs, BSARs, or the FWM. Details of these approaches are described in Early Preliminary Remediation Goals..."	Text will be revised to clarify the methods used to derive sediment PRGs based on tissue residue or dietary dose.	CDM

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
B2-8	Five Tribes	Appendix B2 Section 1.0 Sediment PRGs, third paragraph, page 2	Editorial	I'm not altogether clear what the statement below means. Suggested revisions: "These assumptions ~~impact the development of the~~ change the predictions of bioaccumulation models and therefore the PRGs derived from these models as well as the scales at which the PRGs may be applied."	Text will be revised as recommended	CDM
B2-9	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, first paragraph, page 2	Editorial	The sediment PRGs are shown with three significant digits. Is the third digit at all meaningful in terms of either measurement or ability to predict toxicity?	Presentation of PRGs to 3 significant digits resulted from internal discussions among EPA staff, and recommended revisions are therefore rejected.	CDM
B2-10	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, first paragraph, page 2	Editorial	For clarification, recommend that the following sentence be added to the end of the first paragraph: "PAHs are further subdivided into total carcinogenic PAHs (cPAHs), total low-molecular-weight PAHs (LPAHs) and total high-molecular-weight PAHs (HPAHs)." In addition, the acronym HPAH is not defined in the text currently (second set of bullets in Section 1.1). Suggested definition added above in the sentence recommended for addition to text.	Recommended sentence will be added as suggested.	CDM
B2-11	DEQ	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, third paragraph, page 2	Sediment TRVs	Comment is made with respect to the following statement: "Sediment PRGs were selected or calculated from TRVs identified in the BERA for a number of the BERA sediment COCs. The complete set of contaminants in sediment PRGs for RAO 5 were derived from one of the following four TRV categories." The addition of background on the logic behind the selection of the PRGs would be helpful as well as their intended use. For example, for the bulk sediment SQGs it is not clear if these are to be used to predicted sediment toxicity for identifying areas for toxicity testing or if the use of these benchmarks were selected to achieve other goals related to ecological risk. I would still recommend using a model in its entirety to predict sediment toxicity. Perhaps given the problems with the FPM, the LRM could be used for this purpose. It is unclear the predictive capacity of the combination of these sediment TRVs derived from a range of sources. Additionally, since a wider range of chemicals are associated with toxicity in addition to other PRGs from other exposure/receptor combinations, it is unclear how this list of TRVs was selected.	EPA input is required here.	CDM

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
B2-12	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, first bullet in LRM subsection, page 3	Editorial	Comment is made with respect to the following statement: "• Two pooled species sediment toxicity test endpoints (i.e., *Hyalella azteca* and *Chironomus dilutus*)" What's pooled here—species or test endpoints? Presumably, toxicity tests were done separately on the individual species and the results of those tests were then pooled. Might be clearer to say: "Pooled endpoints from sediment toxicity tests on two different species"	Endpoints were pooled, not species. Recommended text change will be made.	CDM
B2-13	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, third bullet in LRM subsection, page 3	Editorial	The text in the third bullet states, "The fines-adjusted, and fines-adjusted OC-normalized TRVs developed in the Portland Harbor LRMs created difficulties in back transforming the normalized TRVs to a PRG expressed in units of µg/kg or mg/kg dry weight sediment." If this problem is mentioned, its resolution ought to also be mentioned.	EPA input needed here. (Conversion requires selecting average OC, or something similar)	CDM
B2-14	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, LRM subsection, first paragraph after first set of bullets, page 3	Editorial	Comment is made with respect to the following statement: "Sediment PRGs derived from the LRM are at the lower end (i.e. smallest adverse effect) within the range of Level 2 (moderate toxicity) adverse effect concentrations." This seems contradictory: "lowest end…concentrations" and "smallest adverse effect." It would seem small adverse effect would imply higher and not lower concentrations.	Text will be revised to clarify that sediment PRGs derived from the LRM are at the lower concentrations associated with Level 2 (moderate toxicity). Higher concentrations are assumed to cause or contribute to more severe or "larger" adverse effects.	CDM
B2-15	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, LRM subsection, first bullet in second set of bullets, page 3	Editorial	The acronym "SQV" is not defined.	SQV will be defined in revised text (Sediment Quality Value)	CDM
B2-16	DEQ	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, first paragraph under Tissue-residue based Effects Concentration PRGs subsection, page 4	Editorial	Comment is made with respect to the following statement: "For fish, sediment PRGs represent contaminant concentrations calculated to maintain whole body fish contaminant concentrations below those linked to ecologically significant adverse effects on fish themselves (i.e. not on species that feed on fish)." This is not really clear. Suggested rephrasing: "…adverse effects directly on fish (but not secondary effects on other fish from feeding on exposed fish)."	Text will be revised to clarify. Suggest: "…adverse effects directly on fish (but not secondary effects on consumers of exposed fish)."	CDM

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
B2-17	DEQ Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, first paragraph under Tissue-residue based Effects Concentration PRGs subsection, page 4	Methodology	Comment is made with respect to the following statement: "All three methods are described in detail in the *Bioaccumulation Modeling Report* (Windward Environmental 2009)." All methods are described, but the methods used for the EPA selected PRGs are not referenced. Consider adding footnotes for this purpose. For example, "food web model as described by LWG" or "Developed using BSAF methodology, using a BSAF of 4" are necessary to guide the reader to derivation methods of each number. Ideally, fish estimation methods would be similar between human health and ecological risk assessments when the receptor endpoint is the same. For example, DDX modeled to smallmouth bass using a food web model for HH PRGs and a BSAF for the ERA is confusing. The citation in the statement above is not in the list of references.	Text will be revised to include references for the methods used for selected tissue-residue based PRGs.	CDM
B2-18	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, second paragraph under Tissue-residue based Effects Concentration PRGs subsection, page 4	Editorial	Comment is made with respect to the following statement: "The fundamental goal of all three approaches is to ~~identify~~ develop predictive relationships between contaminant concentrations in sediment and contaminant concentrations in either target ecological receptor tissues or the prey of target ecological receptors." The term "identify" overly glorifies the result, implying that some fundamental relationship was discovered, rather than putting together a curve fit.	Recommended revision is acceptable and will be made.	CDM
B2-19	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, first equation in Tissue-residue based Effects Concentration PRGs subsection, page 4	Editorial	Equations should be numbered. Also, since the variables in the equation are italicized, the definitions should be as well.	Recommended revision is acceptable and will be made.	CDM

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
B2-20	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, third paragraph in Tissue-residue based Effects Concentration PRGs subsection, page 4	Editorial	I found the paragraph below very difficult to read in that it seemed to jump back and forth in no clear way between BSAF and BSAR. My suggestion, captured in the revisions below, is to clearly define BSAF, then define BSAR in terms of how it differs from BSAF. Also, while the first sentence discusses linear relationships, you go on to define non-linear relationships below. "BSAFs /BSARs were used to estimate PRGs when a linear relationship between co-located sediment and tissue concentrations could be established based on data collected for the baseline risk assessments. In some cases, a linear relationship in which the regression line based on the concentrations also passed through zero was found adequate. For these, a simple BASF, as defined by Equation A2.1, could be used. In others, data regression identified a more complicated relationship and a BSAR was required. For some cases, a ~~Linear~~ linear relationship~~s~~ could still be identified ~~could be identified~~ from untransformed sediment and tissue data (linear regression), but with a non-zero intercept.~~, relationships where~~ In other cases, a relationship was found to hold when either the sediment or tissue contaminant concentrations were log-transformed (log-linear regressions), or where both sediment and tissue contaminant concentrations were log-transformed (log-log regressions). In all three cases, the resulting regression is the ~~A~~ BSAR and represents the ~~assumes a~~ relationship between the concentration of a bioaccumulative chemical in sediment and that measured in tissue. ~~Frequently, the relationship between tissue and sediment concentrations is calculated as a simple ratio between tissue and sediment concentrations (BSAF) rather than as a BSAR.~~ A BSAR can be considered ~~as~~ to be the slope of ~~a~~ the regression line between tissue and sediment concentrations. The BSAR approach can account for the common observation that the ratio between tissue and sediment concentrations can vary with changes in sediment concentrations, ~~unlike~~a relationship not captured by a single BSAF value. ~~BSAF r~~Ratios between tissue and sediment concentrations often become smaller at high sediment contaminant concentrations. The log transformations of sediment and/or tissue contaminant concentrations can account for ~~the observed changes in BSAF with changes in sediment concentrations~~this type of behavior. Other reasons for preferring BSARs over BSAFs ~~when possible~~ include~~d~~:	Recommended revisions are acceptable and will be made.	CDM
B2-21	DEQ	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, fourth paragraph in the Tissue-residue based Effects Concentration PRGs subsection, page 4	Sediment-Tissue Contaminant Relationships	Comment is made with respect to the following statement: "Due to limited numbers of tissue samples within a sub-section of the site, this was generally not feasible." Yes, but consider that using that same limited tissue set to predict tissue "average" chemistry across the whole 9 miles has more problems. First, I don't think we are interested in the average, but rather segments of the river for exposure areas, and second, predicting an average given the heterogeneity in sources and concentration magnitude has even a GREATER uncertainty. I would argue that the use of composites over smaller areas to develop sediment to tissue relationships is more applicable and has less uncertainty.	EPA disagrees with this comment. The use of averages is appropriate because there are too few paired, co-located tissue/sediment samples within a sub-section of the site to warrant derivation of location-specific BSARs or BSAFs.	CDM

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
B2-22	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, third paragraph in the Total Petroleum Hydrocarbon PRGs subsection, page 5	Editorial	Recommend the following revision: "Having set the molar concentration no-effect level of 0.24 mmol/kg, ~~A~~ a bioaccumulation model was then run backwards, starting with a surrogate chemical to represent all chemicals within a pre-defined TPH fraction, which for FS purposes was the C10 – C12 aliphatic fraction." Not clear what "then" follows.	Current text is simply revealing steps in the process. The word "then" will be removed and the text will be revised to clarify.	CDM
B2-23	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, first paragraph in the Empirical Site Specific Sediment Toxicity Test Based PRGs subsection, page 5	Editorial	With two "or" terms in this sentence, it is unclear if you mean to define two or three outcomes. Recommended revision if correct: "Sediment toxicity test based TRVs are expressed as 1) the minimum allowable percent survival or 2) the minimum percent biomass relative to survival or biomass in the laboratory negative control sediment response for each of four sediment toxicity test endpoints."	Recommended revision is acceptable and will be made.	CDM
B2-24	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, Empirical Site Specific Sediment Toxicity Test Based PRGs subsection, paragraph after bullets on page 6	Editorial	This paragraph was very difficult to follow. I made a number of suggestions that I think would make the language clearer. "The above ~~breakpoints~~ PRGs for minimum allowable survival or biomass were derived from a site- and toxicity test-specific approach for identifying reductions in survival or biomass greater than what would be expected at relatively ~~contaminant-unimpacted~~ contaminant-free portions of Portland Harbor. This approach, termed the reference envelope approach, is described in detail in Section 6 of the final BERA and its associated attachments. For a station to not meet a toxicity-based PRG, the~~se~~ PRGs for survival or biomass must also be ~~statistically significantly reduced from~~lower than the laboratory negative control sediment survival or biomass to a statistically significant degree. In other words, in order to identify a failure to meet a toxicity -test-based PRG, ~~(i.e. Both~~ both the absolute magnitude of the survival or biomass reduction PRG criterion **and** the reduction must ~~be statistically significantly different than~~differ from the control response criterion with statistical significance. ~~must be met before a failure to meet a toxicity test based PRG is identified).~~"	Recommended revisions are acceptable and will be made.	CDM

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
B2-25	DEQ	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, Empirical Site Specific Sediment Toxicity Test Based PRGs subsection, paragraph after bullets on page 6	Sediment Toxicity Tests	Comment is made with respect to the following statement: "For a station to not meet a toxicity based PRG, these PRGs for survival or biomass must also be statistically significantly reduced from the laboratory negative control sediment survival or biomass (i.e. Both the absolute magnitude of the survival or biomass reduction PRG criterion and the reduction must be statistically significantly different than control response criterion must be met before a failure to meet a toxicity test based PRG is identified)." Section 2 describes that both biomass and survival endpoints have to hit in order for it to be considered a PRG exceedance. If that is the case for interpretation of PRGs, that justification should be described here.	Text will be reviewed and revised to clarify that sediment toxicity based PRGs are exceeded if a sediment sample exceeds the maximum allowable percent reduction in either survival or biomass of one of two benthic invertebrate species: larvae of the insect *Chironomus dilutus* and tests started with juveniles of the amphipod *Hyalella azteca*.	CDM
B2-26	Five Tribes	Appendix B2 Section 1.1 Sediment PRGs for RAO 5, third paragraph in the Empirical Site Specific Sediment Toxicity Test Based PRGs subsection, page 6	Editorial	As phrased, a clause in the last sentence in this paragraph confounded reductions and concentrations. Recommended revisions: "Either the percentage reduction in survival or biomass from the toxicity tests overlapped the allowable control mortality or biomass reductions in the ASTM and EPA sediment toxicity testing methodology test acceptability criteria, or the Level 1 reductions in survival or biomass ~~were not statistically significantly different~~ from control sample survival and biomass were not statistically significantly different.	Recommended revisions are acceptable and will be made.	CDM
B2-27	Five Tribes	Appendix B2 Section 2.0 Surface Water PRGs, last two sentences in section, page 7	Editorial	This reference below to water quality criteria comes with no context in this intro paragraph. A sentence needs to be added to indicate why you are referring to the criteria. Perhaps this is where ARARs should be mentioned? "The current EPA aquatic life criteria table is available on the Internet at: http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#altable The most recent published version (in PDF format) of the EPA aquatic life criteria table is EPA (2009)."	EPA input needed (ARAR text removed following internal discussions between EPA staff on 7/16/14). We could insert sentence stating that the only ecological risk-related ARARs are Oregon's water quality standards for aquatic life, and note that those are the same as or very similar to EPA's NRWQC for aquatic life.	CDM
B2-28	Five Tribes	Appendix B2 Section 4.0 References, page 10	Editorial	The references for the EPA documents should be in order of publication year. Also, correct the reference as shown below for the EPA document that is listed under U.S. Environmental Protection Agency instead of EPA like the other documents: "EPA. 2003. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Nonionic Organics. EPA-600-R-02-014, Office of Research and Development, US Environmental Protection Agency, Washington, D.C."	Agree that references will be presented in a consistent manner. Need input re: order by publication year, since we usually order by year only within the same source (i.e., all EPA docs are grouped together, then ordered by year).	CDM
B2-29	DEQ	Tables	Editorial	Footnotes in the tables on the methods used would allow the reader to understand the PRG basis in the cases where the source is not in the header of the table (e.g., "food web model", "BSAF").	Recommendation is acceptable and footnotes will be added to the tables.	CDM